

# Weekly Report for 07/13/2015

## APS Renewal and Upgrade

- Worked with Kathy on the CD1 talked. (Chih-Yuan Yao)
- Continue to work on the HV feedthrough for MBA fast kickers with Xiang and the vendor. Revised the original design and made an alternative design that has lower maximum E-field. Present both to the vendor. (Chih-Yuan Yao)
- Attended CD1 director's review and helped answer questions. (Chih-Yuan Yao)
- Prepare for CD1 Directors Review. (Yipeng Sun)
- Present a talk on CD1 Directors Review. (Yipeng Sun)
- MOGA optimization of alternate upgrade lattices with reverse bends. (Yipeng Sun)
- Obtained and compiled an ion simulation code from CERN (modified at Cornell), which models both the ions and beam with macroparticles. (Joe Calvey)
- Gave a presentation at the injector working group meeting on the current status of PAR measurements and analysis, including high charge predictions. (Joe Calvey)
- Discussed impedance bench measurements with R. Lindberg and M. Sangroula. (Joe Calvey)

## MCR Operations

### Linac Operations

- Continued to work on regen alignment; later in the week, was joined by Anthony DiChiara (XSD-TRR). By the end of the week, the regen was free-lasing with a threshold current near 74 A. (Jeff Dooling)
- Collected images of the regen output with the LaserCamHR after the DS end-mirror. (Jeff Dooling)
- During access to the Linac tunnel, aligned the low-power green laser installed on the pc gun optics table onto the photocathode; saw characteristic double-spot pattern on the PC using the CIM camera. (Jeff Dooling)
- For low-power laser alignment from the Laser Room (APS\_1685105), resolved one of the issues preventing the opening the ACIS gate valve shutter, but found two more. (Jeff Dooling)
- One is a Controls calculation that S. Shoaf will fix, but the other is the Linac shutter controlled by LACIS (not the ACIS gate valve shutter). (Jeff Dooling)
- The linac shutter must also be allowed to open while the uv drive laser is off. Working on this with G. Markovich (AES-SI). (Jeff Dooling)
- Found an issue with the MIZAR timing box used for triggering the laser Pockels Cells. S. Shoaf found that the newly-installed, faster processor was the cause; Shoaf was able to modify the driver s/w to allow the MIZAR to function with the faster processor. (Jeff Dooling)
- Ordered new Brewster-cut laser rods from Kigre Inc. and well as an IR viewer and other optics h/w for the laser. (Jeff Dooling)
- While in ACIS interlock bypass mode in the linac tunnel (APS\_119285), used the low-power, green laser from the Laser Room to check alignment the transport line and coarse-align optics on the pc gun optics table in the tunnel. (Jeff Dooling)

- With D. Weyer conducted Quarterly LACIS validation (APS\_1196673) on Wednesday. (Jeff Dooling)

## ITS Operations

- Using a network analyzer, adjusted the ITS water temp to obtain a tune frequency of 2856MHz. The tune water temperature for the 3G2 gun was found at 129.5 degrees F. Note - the cathode was set for 20watts. RF conditioning is expected to start the week of 7/27 followed by experimental measurements of electron back-bombardment in thermionic rf guns by an outside user. (Stan Pasky)

## Procedures

- Created - "K3 RF Conditioning Guide for K2 Down Support" (Stan Pasky)
- Linac Klystron three (K3) supports the operation of our PCGun and Injector Test Stand. It also is our backup klystron for K1 and K2 in the event they become disabled. With that said, it is important that K3 and related waveguide, windows and S-Band switches remain in a RF conditioned state. This K3 RF Conditioning Guide has been created for that purpose. In the event K2 fails K3 will need to provide ~28MWatts of power to the L2 SLED to support User Operations. This conditioning guide will be utilized every other week when not supporting PCGun Operations, Injector Test Stand experiments or during the Injector Studies Period, unless scheduled. (Stan Pasky)

## APS Machine Studies

### Storage Ring Studies

- Assisted Louis polarization study. (Chih-Yuan Yao)

### Booster Studies

- Tested booster BPM ram waveform configuration and measured responses. Investigated the scope waveform trigger timing relative to booster injection. (Chih-Yuan Yao)
- Remeasured booster 92nm lattice chromaticity and tuned up for normal operations with Kathy Harkay and Hairong Shang. (Chih-Yuan Yao)
- Performed DC ramp mode booster study. Installed a standardizing program in order to reproduce a lattice. Verified that the DC ramp lattice is the 92nm lattice we operate with. (Chih-Yuan Yao)

### PAR Studies

- Performed 1Hz PAR test. The test could not proceed due to an BESCOM trip. (Chih-Yuan Yao)
- Performed PAR ion effect studies with Joe and Kathy. (Chih-Yuan Yao)
- Measured tune shift along the PAR cycle with gated drive signal. Discovered that this leads to a much larger tune shift and tune spread than previously measured, presumably because more ions are trapped. Also measured tune signal as a function of drive length. (Joe Calvey)

### Linac Studies

- Updated PemTool - (Stan Pasky)
- K2 down with R. Solidays assistance. The updates have improved the the switching process as well as decrease the time it takes to switch to this mode of operation (Stan Pasky)
- 1 Hz Mode Operation - (Stan Pasky)

- We cannot run 1 Hz mode until the LTP BESOCM is configured and installed for use during 1 Hz operation only. The Linac BESCOM will be used for 2 through 30 Hz. (Stan Pasky)
- 1 Hz operation also affected more than just BESCOM. It affected all the interleaving supplies LTP:B1, PTB:B1 and PTB:B2 thus causing gun inhibits. (Stan Pasky)
- Current belief is that the change in injector timing to 1Hz affected the timing fiber to the interleaving supplies. This fiber timing signal controls the ADC for the current read-back and synchronizes the internal DSP timing of the supply. The power supply with a 1Hz fiber timing signal is NOT compatible with the supply operations. Changes are being investigated by the power supply group. (Stan Pasky)
- Injector Studies - Assisted Linac Machine Manager with interleaving studies which required transporting beam through the PAR bypass line as well as Tcav beam lattice studies creating various beam energy files through LTP:B1 and checking the beam profile on LTP:FL1. (Stan Pasky)

## APS Machine Research and Development

### Booster Research and Development

- Investigated methods of tuning booster RF waveforms and detunings. (Chih-Yuan Yao)
- Proposed tuning method for booster RF5 waveform and detuning during study and discussed with RF group. (Chih-Yuan Yao)

## APS Machine Software

### Storage Ring

- added manually switching SCU0 and SCU1 to user operation mode after global switches for switching to usermode pem,, because global switch switches SCU0 and SCU1 to operator mode instead of user operation mode. (Hairong Shang)

### Injectors

- did machine studies on DC ramps with CY, wrote set booster single corrector ramp script and 4 corrector ramp script. Did booster 4 corrector DC bump scan, and response measurements. (Hairong Shang)
- tested and installed boosterResponseMeasurement, a special response measurement application for booster BPS100 bpms. (Hairong Shang)
- tested and installed setBoosterBPMTIMESegf or setting booster BSP100 bpm timings. (Hairong Shang)
- tested and installed checkAndLoadBoosterBump: (Hairong Shang)

### General

- per Shifu Xu's request, wrote cavputwaveform so that he can write similar waveform pvs in one command. (Hairong Shang)

## Meetings, workshops, conferences, committees, LMS related, and reviews

- Prepare for CD1 Directors Review. (Yipeng Sun)
- Present a talk on CD1 Directors Review. (Yipeng Sun)
- Attended the ACIS Upgrade technical review presentation dry run. (Stan Pasky)

- Updated Spreadsheet for OPS/APSU Obsolescence list - (Stan Pasky)

- I met with Nancy Grossman last week to discuss replacement items for the injector. This is all in a draft state, but it is a good start. Continue discussions with our support group should bring to light the need for replacing many items in our Low Level rf and timing systems. (Stan Pasky)